

**Name of the MSC Fellow: Abdullah Demir**

**Nationality: Turkey**

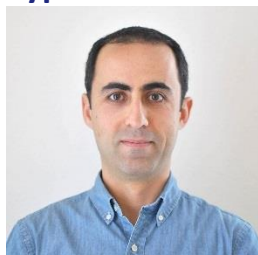
**Host organization: Bilkent University - UNAM**

**Country of the Host: Turkey**

**Project Acronym: NOVEL**

**Project start and end date: 1/1/2018 – 31/12/2019**

**Type of MSC action, H2020: IF**



### **Your story:**

#### **Project objectives and research field:**

Significant advances are needed to improve the speed and efficiency of future communication and computing systems. Photonic interconnect components are the only solution to offer both high speed and low power consumption. Our objective is to develop nanoscale lasers with an ultra-low threshold, high energy efficiency and ultra-fast operation for future optical interconnects and light sources.

#### **Tell us why your topic is important and/ or how it brings to advancement in your research field:**

Even though the current micro-laser technology (VCSEL, vertical cavity surface emitting laser) has been very successful, its processing approach has been proven to be particularly challenging for miniaturization, it reduces the reliability for small lasers and its high thermal resistance substantially degrades the lasers' performance. This project addresses these bottlenecks. The innovation underpinning this project is based on using a lithographically defined laser concept to develop a novel growth and fabrication process for nanolasers. This will employ a buried electrical- and optical-confinement method to scale the cavity down to sub-micron sizes in 3D to demonstrate the viability and performance of a nanolaser. Additionally, this research project aims to investigate the potential of nanolaser array architectures for applications in sensing and gesture recognition.

#### **What are the benefits of participating in a MSC action?**

The MSCA gave me the opportunity to dedicate my time on the project and will help me to reintegrate into the European and Turkish academia. My plan was to establish an independent research programme with the aim of embracing both industry-aligned research and fundamental science. I was offered and accepted a faculty

position in Bilkent – UNAM. I am currently establishing my own independent research group. I believe MSCA fellowship was very instrumental in securing this position. This project also reinforced my position and is enabling me to reach a position of professional maturity. I am currently co-advising a graduate student and giving a training about this project. The emerging/future applications of these devices are in smartphones, mobile devices, autonomous driving, and collision avoidance systems, each immensely contributes to the advancement of our society.

**Did you encounter any challenges during application/ implementation and did you get any help?**

I encountered several challenges during these periods. TÜBİTAK (The Scientific and Technological Research Council of Turkey) and the NCP have been very supportive and prompt in providing feedback. I attended the MSCA info days organized by them and these were very helpful in my application. I also contacted our NCP and Bilkent University Technology Transfer Office several times to ask questions about various implementation procedures and got detailed responses. All have contributed to getting a successful result in my project application.

**Why did you choose a widening country as a Host? What was the reason that convinced you? What is making you professionally happy here?**

Turkey has been gradually improving its support of science and technology, and it increased the amount of funding for industrial R&D as well. Bilkent University and UNAM (National Nanotechnology Research Center), with its infrastructure and collaborative environment, would be an excellent host for my career development and for generating new innovative ideas. Bilkent's research environment in engineering and sciences, especially in optoelectronics and nanotechnology, would be a great benefit for me. All these were the motivation for me to choose Turkey and Bilkent - UNAM as a host.

**Would you recommend others to apply? What useful advice/ tips can you give them?**

I strongly recommend others to apply for MSCA. This fellowship obviously offers financial freedom and enables intellectual independence, but more importantly, it provides a great base to establish your own research programme and roadmap. I advise the applicants to start building their project ideas and writing their proposals very early. They should use all possible resources in writing their projects (MSCA guide for applicants, NCP, supervisor, colleagues) and do not hesitate to rewrite/polish their projects many times.